

Range extension of *Kinosternon leucostomum leucostomum* (Duméril & Bibron in Duméril & Duméril, 1851) (Kinosternidae) in the Central Depression of Chiapas, Mexico

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Abstract. Here, we use records between 1998 and 2024 to document the occurrence of a native population of the turtle *Kinosternon leucostomum leucostomum* (Duméril & Bibron in Duméril & Duméril, 1851) in the Central Depression of Chiapas, Mexico. Morphological measurements are provided to characterize variation among individuals. We report 22 individuals, which were captured from Laguna Bélgica, captured in October and November 1998, and six individuals photographed by rangers in 2024. This is the first record of the species in the region, which represent a higher altitude locality compared with previously documented for wild populations of this turtle in Mexico.

Key words. Laguna Bélgica, new record, Ocozocoautla de Espinosa, Testudines, White-lipped Mud Turtle

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INTRODUCTION

Kinosternon leucostomum (Duméril & Bibron in Duméril & Duméril, 1851), White-lipped Mud Turtle, is a continental turtle with a wide distribution from Mexico, south through Central America, to the Pacific slopes of Colombia and Ecuador. Records from northern Peru are unverified (Carr and Almendáriz 1989). Large variation in individual body size and population means are well documented across the this species' range (Carr and Almendáriz 1989; Legler and Vogt 2013); however, intermediate-sized individuals are present in most populations (Legler and Vogt 2013). Currently, two subspecies are recognized: 1) *K. l. leucostomum* (Duméril & Bibron in Duméril & Duméril, 1851), with populations known from Mexico to Nicaragua, and 2) *K. l. postinguinale* (Cope, 1887), from Nicaragua to Ecuador. In Mexico, the distribution of *K. l. leucostomum* include water bodies above 300 m in altitude in watersheds of the Gulf of Mexico from Veracruz to Quintana Roo (Legler and Vogt 2013; TTWG 2021).

Adult females of *K. l. leucostomum* reach a straight carapace length (SCL) of 208 mm, while males are markedly larger at 214 mm maximum SCL (Carr and Almendáriz 1989; Legler and Vogt 2013). White-lipped Mud Turtles are omnivorous, generally consuming fruits, insects, and fishes, with their dietary proportions varying in response to local and seasonal availability (Vogt and Guzman 1988). Across the range, the primary threats to population viability are habitat destruction and alteration, and illegal collection for food or pet trade (Legler and Vogt 2013; Ennen et al. 2020). Currently, *K. l. leucostomum* is considered Under Special Protection in Mexico (SEMARNAT 2010), and not included in the IUCN Red List (IUCN 2024).

For the state of Chiapas, the White-lipped Mud Turtle is widely distributed across the lowlands of the Gulf Coastal Plain, Northern Highlands, Central Plateau, and Eastern Highlands physiographic regions (Johnson et al. 2015; TTWG 2021). There are no records of *K. l. leucostomum* outside of these physiographic regions in Chiapas (TTWG 2021). Here, we report a population of *K. l. leucostomum* at a new locality in the Central Depression of Chiapas that constitutes a geographically and ecologically important range extension.



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METHODS

Fieldwork was conducted as part of a biological inventory and monitoring program at the Zona Sujeta a Conservación Ecológica Laguna Bélgica (referenced below as Laguna Bélgica) into the municipality of Ocozocoautla de Espinosa (Figure 1) in October and November 1998. We used aquatic folding box traps (ca. 70 cm × 40 cm × 30 cm; mesh size 1 cm) to capture specimens for further evaluation in 1998. We also evaluated photographs of the dorsal and central view taken by the Laguna Bélgica rangers in August 2024 (see Acknowledgements). All the photographs were deposited in the Museo de Zoología Alfonso L. Herrera of the Facultad de Ciencias of the Universidad Nacional Autónoma de México (MZFC, for its acronym in Spanish).

We recorded morphological measurements and secondary sex characteristics of captured individuals in 1998 according to the methods described by Legler and Vogt (2013), where adult female = the cloaca not exceeding the edge of the posterior marginal scutes when ≥ 86 mm straight midline carapace length; adult male = the cloaca exceeding the edge of the posterior marginal scutes when ≥ 81 mm straight midline carapace length. All specimens were measured to the nearest centimeter with dial calipers and nearest gram with a spring scale for five morphometrics that includes body mass, straight midline carapace length (SMCL), straight maximum carapace width, straight maximum carapace height and the straight midline plastron length. For each measurement we report the mean, standard deviation, and minimum and maximum value.

We handled individuals in 1998 with permission from the Dirección General de Vida Silvestre de la Secretaría de Medio Ambiente, Recursos Naturales y Pesca de México (collection permit DOO 750.12029/98). Photos provided by local rangers in 2024 were used under the permission provided by the Dirección de Áreas Naturales y Vida Silvestre de la Secretaría de Medio Ambiente e Historia Natural del Estado de Chiapas (SEMAHN, for its acronym in Spanish). We produced the range map in QGIS v. 3.18.1-Zürich (QGIS Development Team 2024) using distribution data from TTWG (2021).

RESULTS

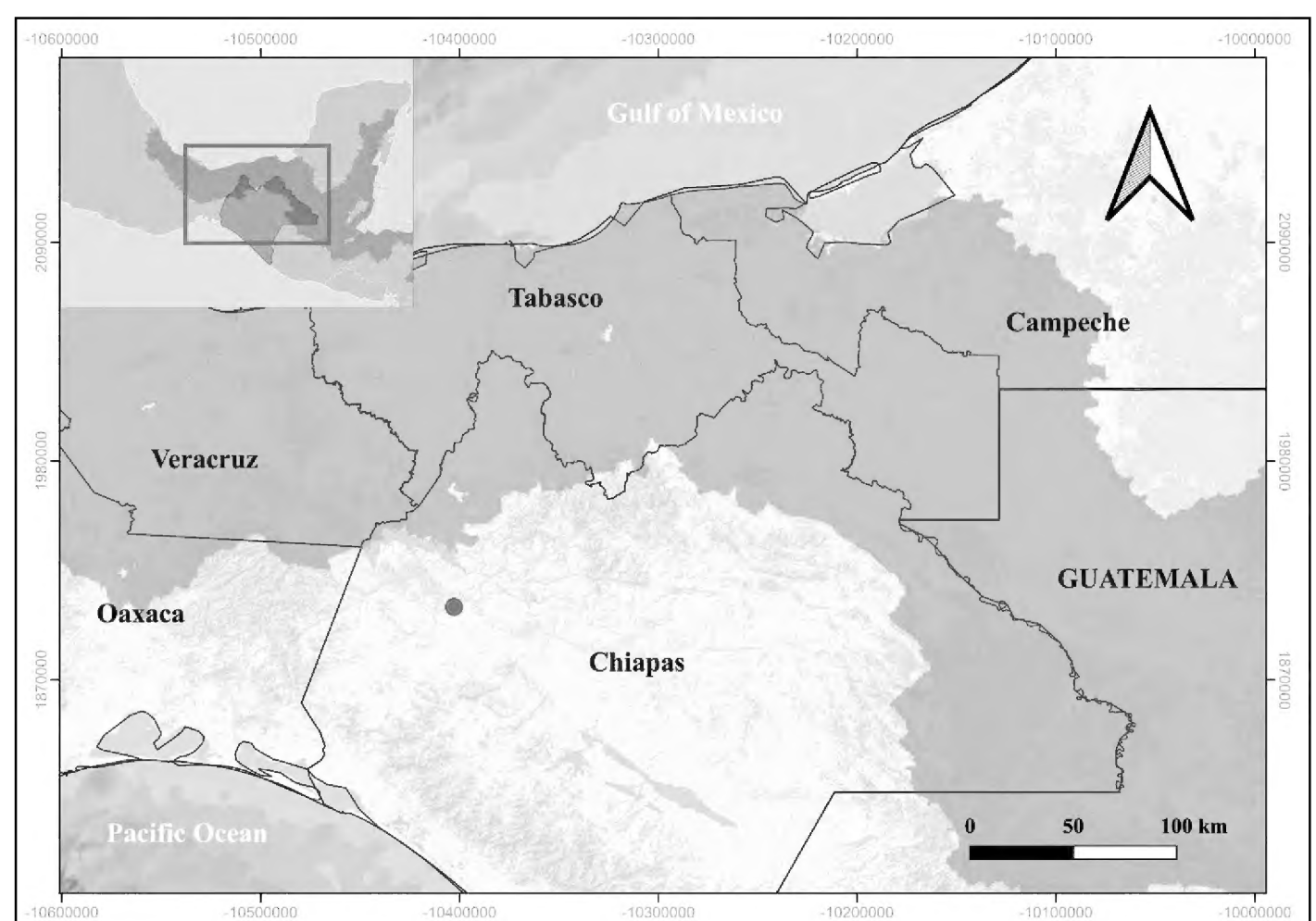
Kinosternon leucostomum leucostomum, (Duméril & Bribon in Duméril & Duméril 1851)

Figures 1–3

New record. MEXICO – CHIAPAS • Municipality of Ocozocoautla de Espinosa; 16.8788°, −093.4569°; 1,005 m a.s.l.; 18.X.1998; N. P. López-León leg.; 5 ♀ adult, MZFC-HE-IMG 199–208; 1 hatchling unsexed, MZFC-HE-IMG 209, 210.

In October and November 1998, we captured, marked, and measured 22 adults of *K. l. leucostomum* (12 females and 10 males; Table 1). Adult females measured 115.5 mm (± 8.8 mm) SMCL, on average, and adult males of measured 121.4 mm (± 17.7 mm) SMCL on average. The remaining body size data are presented in Table 1. In August 2024, photographs of six individuals (one unsexed hatchling and five adult females) were presented to us.

Figure 1. Record (red dot) of *Kinosternon leucostomum leucostomum* in Laguna Bélgica, municipality of Ocozocoautla de Espinosa, Chiapas, Mexico. The orange shaded area represents the distribution range of the turtle.



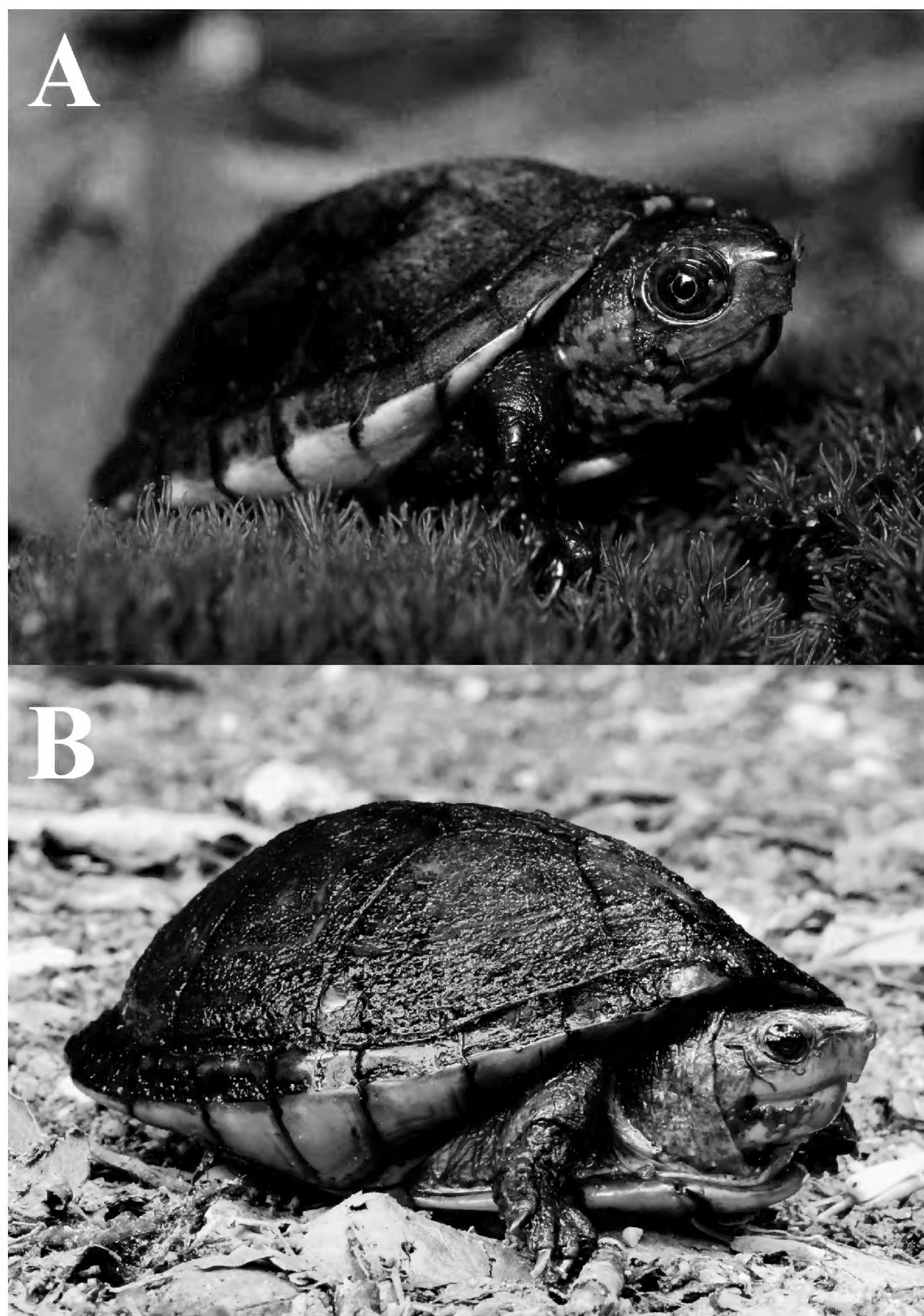


Figure 2. General views of *Kinosternon leucostomum leucostomum* recorded in Laguna Bélgica municipality of Ocozocoautla de Espinosa, Chiapas, Mexico. **A.** Hatchling (unsexed). **B.** Adult female.

Identification. We determined the taxonomic identity of each individual in the 1998 sample and each individual in the 2024 photographs by key meristic features of the carapace and plastron: the presence of 11 marginal scutes and a very small or absent abdominal scute indicate *K. l. leucostomum* (Hutchison 1991), and the presence of axillary scutes, the reduced size of the inguinal scutes, and the unicarinate shape of the carapace differentiate *K. l. leucostomum* from *K. abaxillare* (a sympatric Kinosternid in the Central Depression of Chiapas; Legler and Vogt 2013; Reyes-Grajales and Iverson 2020).

DISCUSSION

In this paper we report the first record of a natural population of *K. l. leucostomum* in the Central Depression of Chiapas, and it also corresponds to the highest elevation recorded (1005 m) for taxon within its distribution in Mexico (<300 m a.s.l.), and potentially throughout its range (<750 m a.s.l.; see Legler and Vogt 2013). We extended the geographic distribution of this species approximately 40 km to the south of its previous locality recorded in the lowlands of the Northern Highlands of Chiapas (TTWG 2021). Prior to our records, in the Central Depression of Chiapas, only *K. abaxillare* had been reported as a native continental turtle (Reyes-Grajales and Iverson 2020; TTWG 2021), and *Trachemys scripta* as an invasive turtle

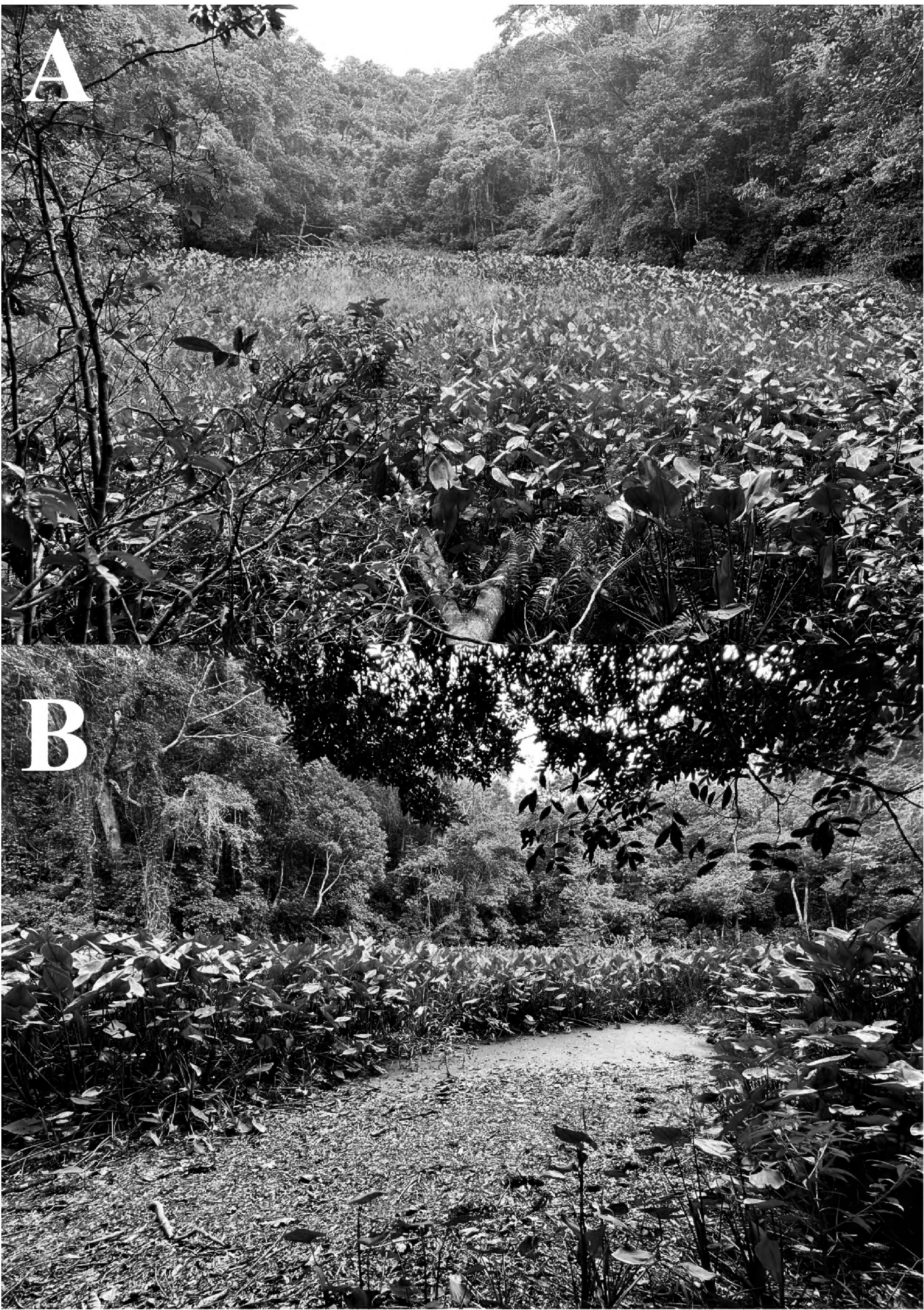


Figure 3. General views of the Laguna Bélgica taken photographed in the rainy season of 2024. **A.** North side. **B.** South side.

Table 1. Morphological and meristic data of *Kinosternon leucostomum leucostomum* captured in the Laguna Bélgica. Body mass is expressed in g, and the rest of the morphometric measurements are expressed in mm. Left: average \pm standard deviation, right: minimum and maximum values.

| | Adult females (<i>n</i> = 12) | | Adult males (<i>n</i> = 10) | |
|----------------------------------|--------------------------------|-----------|------------------------------|--------|
| Body mass | 175.0 \pm 45.8 | 120–290 | 190.5 \pm 101.6 | 90–405 |
| Straight midline carapace length | 115.5 \pm 8.8 | 102.5–134 | 121.4 \pm 17.7 | 98–156 |
| Straight maximum carapace width | 78.3 \pm 4.3 | 72–88 | 80.5 \pm 8.4 | 67–97 |
| Straight maximum carapace height | 47.8 \pm 4.3 | 40–58 | 47 \pm 6.4 | 40–59 |
| Straight midline plastron length | 105.8 \pm 7.3 | 93–122 | 109.5 \pm 12.9 | 92–136 |

(Reyes-Grajales 2021). Accordingly, this work increases the richness of continental turtles in this physiographic region of Chiapas and contributes to the knowledge of the distribution of the species in Mexico. Further investigation is needed to determine if there are native populations of *K. l. leucostomum* on the north side of the Central Depression.

It is important to consider that given the absence of reports in official records (e.g. Secretariat of Environment and Natural History of the State of Chiapas) or virtual repositories (iNaturalist 2024a; GBIF 2024), the Laguna Bélgica potentially represents the distribution limit of *K. l. leucostomum* in the northwestern portion of the state of Chiapas. There is an isolated report of a *K. l. leucostomum* specimen in the municipality of Suchiapa on April 26, 2022 (iNaturalist 2024b). However, the scarcity of other reports from this region on the same platform, combined with the high mobility of turtles by humans for food or pets, suggests that this report could be based on a translocated individual.

The small size of the Laguna Bélgica (<0.5 ha; Figure 3), the absence of other permanent or seasonal water bodies in the surrounding area, and the high alteration of habitats outside the Belgium Lagoon, suggest limited movement between different populations. We encourage the establishment of a local program to better understand this turtle population due to its unique locality. This could contribute to our understanding of variation in population ecology throughout its distribution area, and determine the conservation status of *K. l. leucostomum* in the study area.

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: ERG, LAMA, ADW, TSA. Formal analysis: ERG. Funding acquisition: ERG, ADW, TSA. Investigation: ERG, NPLL, LAMA, ADW, TSA. Writing – original draft: ERG. Writing – review and editing: ERG, LAMA, ADW, TSA.

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Data availability

All data that support the findings of this study are available in the main text.

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